



SEQUENCE LISTING

<110> LOOSMORE, SHEENA MAY
MINKE, JULES MAARTEN

<120> RECOMBINANT VACCINE AGAINST WEST NILE VIRUS

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<140> 10/714,781

<141> 2003-11-17

<150> 10/679,520

<151> 2003-10-06

<150> 10/374,953

<151> 2003-02-26

<150> 10/116,298

<151> 2002-04-04

<150> 60/281,923

<151> 2001-04-06

<150> 10/676,502

<151> 2003-09-30

<150> PCT/FR02/01200

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<160> 85

<170> PatentIn Ver. 3.2

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1 5 10

<210> 41
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<213> West Nile virus

<400> 41
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1 5 10

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 acaaaaacac acggtgatta tcaaccatct aacgaacaga tattacaaaa aatacgtcgg 4761
 actatggaaa acgaagctga tagcctcaat agaagaagca ttaaagaaat tgttgtagat 4821
 gttatgaaga attgggatca tcctctcaac gaagaaatag ataaagttct aaactggaaa 4881
 aatgatacat taaacgattt agatcatcta aatacagatg ataattattaa ggaaatcata 4941
 caatgtctga ttagagaatt tgcgttttaa aagatcaatt ctattatgta tagttatgct 5001
 atggtaaaac tcaattcaga taacgaaaca ttgaaagata aaattaagga ttattttata 5061
 gaaactattc ttaaagacaa acgtgggttat aaacaaaagc cattaccc 5109

<210> 57
 <211> 684
 <212> PRT
 <213> West Nile virus

<400> 57
 Met Thr Gly Ile Ala Val Met Ile Gly Leu Ile Ala Ser Val Gly Ala
 1 5 10 15
 Val Thr Leu Ser Asn Phe Gln Gly Lys Val Met Met Thr Val Asn Ala
 20 25 30
 Thr Asp Val Thr Asp Val Ile Thr Ile Pro Thr Ala Ala Gly Lys Asn
 35 40 45
 Leu Cys Ile Val Arg Ala Met Asp Val Gly Tyr Met Cys Asp Asp Thr
 50 55 60
 Ile Thr Tyr Glu Cys Pro Val Leu Ser Ala Gly Asn Asp Pro Glu Asp
 65 70 75 80
 Ile Asp Cys Trp Cys Thr Lys Ser Ala Val Tyr Val Arg Tyr Gly Arg
 85 90 95
 Cys Thr Lys Thr Arg His Ser Arg Arg Ser Arg Arg Ser Leu Thr Val
 100 105 110
 Gln Thr His Gly Glu Ser Thr Leu Ala Asn Lys Lys Gly Ala Trp Met
 115 120 125
 Asp Ser Thr Lys Ala Thr Arg Tyr Leu Val Lys Thr Glu Ser Trp Ile
 130 135 140
 Leu Arg Asn Pro Gly Tyr Ala Leu Val Ala Ala Val Ile Gly Trp Met
 145 150 155 160
 Leu Gly Ser Asn Thr Met Gln Arg Val Val Phe Val Val Leu Leu Leu
 165 170 175
 Leu Val Ala Pro Ala Tyr Ser Phe Asn Cys Leu Gly Met Ser Asn Arg
 180 185 190

Asp Phe Leu Glu Gly Val Ser Gly Ala Thr Trp Val Asp Leu Val Leu
 195 200 205
 Glu Gly Asp Ser Cys Val Thr Ile Met Ser Lys Asp Lys Pro Thr Ile
 210 215 220
 Asp Val Lys Met Met Asn Met Glu Ala Ala Asn Leu Ala Glu Val Arg
 225 230 235 240
 Ser Tyr Cys Tyr Leu Ala Thr Val Ser Asp Leu Ser Thr Lys Ala Ala
 245 250 255
 Cys Pro Thr Met Gly Glu Ala His Asn Asp Lys Arg Ala Asp Pro Ala
 260 265 270
 Phe Val Cys Arg Gln Gly Val Val Asp Arg Gly Trp Gly Asn Gly Cys
 275 280 285
 Gly Leu Phe Gly Lys Gly Ser Ile Asp Thr Cys Ala Lys Phe Ala Cys
 290 295 300
 Ser Thr Lys Ala Ile Gly Arg Thr Ile Leu Lys Glu Asn Ile Lys Tyr
 305 310 315 320
 Glu Val Ala Ile Phe Val His Gly Pro Thr Thr Val Glu Ser His Gly
 325 330 335
 Asn Tyr Ser Thr Gln Val Gly Ala Thr Gln Ala Gly Arg Phe Ser Ile
 340 345 350
 Thr Pro Ala Ala Pro Ser Tyr Thr Leu Lys Leu Gly Glu Tyr Gly Glu
 355 360 365
 Val Thr Val Asp Cys Glu Pro Arg Ser Gly Ile Asp Thr Asn Ala Tyr
 370 375 380
 Tyr Val Met Thr Val Gly Thr Lys Thr Phe Leu Val His Arg Glu Trp
 385 390 395 400
 Phe Met Asp Leu Asn Leu Pro Trp Ser Ser Ala Gly Ser Thr Val Trp
 405 410 415
 Arg Asn Arg Glu Thr Leu Met Glu Phe Glu Glu Pro His Ala Thr Lys
 420 425 430
 Gln Ser Val Ile Ala Leu Gly Ser Gln Glu Gly Ala Leu His Gln Ala
 435 440 445
 Leu Ala Gly Ala Ile Pro Val Glu Phe Ser Ser Asn Thr Val Lys Leu
 450 455 460
 Thr Ser Gly His Leu Lys Cys Arg Val Lys Met Glu Lys Leu Gln Leu
 465 470 475 480
 Lys Gly Thr Thr Tyr Gly Val Cys Ser Lys Ala Phe Lys Phe Leu Gly
 485 490 495
 Thr Pro Ala Asp Thr Gly His Gly Thr Val Val Leu Glu Leu Gln Tyr
 500 505 510
 Thr Gly Thr Asp Gly Pro Cys Lys Val Pro Ile Ser Ser Ala Ala Ser
 515 520 525
 Leu Asn Asp Leu Thr Pro Val Gly Arg Leu Val Thr Val Asn Pro Phe

530					535					540					
Val	Ser	Val	Ala	Thr	Ala	Asn	Ala	Lys	Val	Leu	Ile	Glu	Leu	Glu	Pro
545					550					555					560
Pro	Phe	Gly	Asp	Ser	Tyr	Ile	Val	Val	Gly	Arg	Gly	Glu	Gln	Gln	Ile
				565					570					575	
Asn	His	His	Trp	His	Lys	Ser	Gly	Ser	Ser	Ile	Gly	Lys	Ala	Phe	Thr
			580					585					590		
Thr	Thr	Leu	Lys	Gly	Ala	Gln	Arg	Leu	Ala	Ala	Leu	Gly	Asp	Thr	Ala
		595					600					605			
Trp	Asp	Phe	Gly	Ser	Val	Gly	Gly	Val	Phe	Thr	Ser	Val	Gly	Lys	Ala
	610					615					620				
Val	His	Gln	Val	Phe	Gly	Gly	Ala	Phe	Arg	Ser	Leu	Phe	Gly	Gly	Met
625					630					635					640
Ser	Trp	Ile	Thr	Gln	Gly	Leu	Leu	Gly	Ala	Leu	Leu	Leu	Trp	Met	Gly
				645					650					655	
Ile	Asn	Ala	Arg	Asp	Arg	Ser	Ile	Ala	Leu	Thr	Phe	Leu	Ala	Val	Gly
			660					665					670		
Gly	Val	Leu	Leu	Phe	Leu	Ser	Val	Asn	Val	His	Ala				
		675					680								

<210> 58
 <211> 2087
 <212> DNA
 <213> West Nile virus

<220>
 <221> CDS
 <222> (15)..(2072)

<400> 58	
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Met Gly Ser Thr Gly Ile Ala Val Met Ile Gly Leu	
1 5 10	
atc gcc agc gta gga gca gtt acc ctc tct aac ttc caa ggg aag gtg	98
Ile Ala Ser Val Gly Ala Val Thr Leu Ser Asn Phe Gln Gly Lys Val	
15 20 25	
atg atg acg gta aat gct act gac gtc aca gat gtc atc acg att cca	146
Met Met Thr Val Asn Ala Thr Asp Val Thr Asp Val Ile Thr Ile Pro	
30 35 40	
aca gct gct gga aag aac cta tgc att gtc aga gca atg gat gtg gga	194
Thr Ala Ala Gly Lys Asn Leu Cys Ile Val Arg Ala Met Asp Val Gly	
45 50 55 60	
tac atg tgc gat gat act atc act tat gaa tgc cca gtg ctg tcg gct	242
Tyr Met Cys Asp Asp Thr Ile Thr Tyr Glu Cys Pro Val Leu Ser Ala	
65 70 75	
ggt aat gat cca gaa gac atc gac tgt tgg tgc aca aag tca gca gtc	290
Gly Asn Asp Pro Glu Asp Ile Asp Cys Trp Cys Thr Lys Ser Ala Val	
80 85 90	

tac Tyr	gtc Val	agg Arg 95	tat Tyr	gga Gly	aga Arg	tgc Cys	acc Thr 100	aag Lys	aca Thr	cgc Arg	cac His	tca Ser 105	aga Arg	cgc Arg	agt Ser	338
cgg Arg	agg Arg 110	tca Ser	ctg Leu	aca Thr	gtg Val	cag Gln 115	aca Thr	cac His	gga Gly	gaa Glu	agc Ser 120	act Thr	cta Leu	gcg Ala	aac Asn	386
aag Lys 125	aag Lys	ggg Gly	gct Ala	tgg Trp	atg Met 130	gac Asp	agc Ser	acc Thr	aag Lys	gcc Ala 135	aca Thr	agg Arg	tat Tyr	ttg Leu	gta Val 140	434
aaa Lys	aca Thr	gaa Glu	tca Ser	tgg Trp 145	atc Ile	ttg Leu	agg Arg	aac Asn	cct Pro 150	gga Gly	tat Tyr	gcc Ala	ctg Leu	gtg Val 155	gca Ala	482
gcc Ala	gtc Val	att Ile	ggg Gly 160	tgg Trp	atg Met	ctt Leu	ggg Gly	agc Ser 165	aac Asn	acc Thr	atg Met	cag Gln 170	aga Arg	gtt Val	gtg Val	530
ttt Phe	gtc Val	gtg Val 175	cta Leu	ttg Leu	ctt Leu	ttg Leu	gtg Val 180	gcc Ala	cca Pro	gct Ala	tac Tyr	agc Ser 185	ttc Phe	aac Asn	tgc Cys	578
ctt Leu	gga Gly 190	atg Met	agc Ser	aac Asn	aga Arg	gac Asp 195	ttc Phe	ttg Leu	gaa Glu	gga Gly	gtg Val 200	tct Ser	gga Gly	gca Ala	aca Thr	626
tgg Trp 205	gtg Val	gat Asp	ttg Leu	gtt Val	ctc Leu 210	gaa Glu	ggc Gly	gac Asp	agc Ser	tgc Cys 215	gtg Val	act Thr	atc Ile	atg Met	tct Ser 220	674
aag Lys	gac Asp	aag Lys	cct Pro	acc Thr 225	atc Ile	gat Asp	gtg Val	aag Lys	atg Met 230	atg Met	aat Asn	atg Met	gag Glu	gcg Ala 235	gcc Ala	722
aac Asn	ctg Leu	gca Ala	gag Glu 240	gtc Val	cgc Arg	agt Ser	tat Tyr	tgc Cys 245	tat Tyr	ttg Leu	gct Ala	acc Thr	gtc Val 250	agc Ser	gat Asp	770
ctc Leu	tcc Ser	acc Thr 255	aaa Lys	gct Ala	gcg Ala	tgc Cys	ccg Pro 260	acc Thr	atg Met	gga Gly	gaa Glu	gct Ala 265	cac His	aat Asn	gac Asp	818
aaa Lys	cgt Arg 270	gct Ala	gac Asp	cca Pro	gct Ala	ttt Phe 275	gtg Val	tgc Cys	aga Arg	caa Gln	gga Gly 280	gtg Val	gtg Val	gac Asp	agg Arg	866
ggc Gly 285	tgg Trp	ggc Gly	aac Asn	ggc Gly	tgc Cys 290	gga Gly	cta Leu	ttt Phe	ggc Gly	aaa Lys 295	gga Gly	agc Ser	att Ile	gac Asp	aca Thr 300	914
tgc Cys	gcc Ala	aaa Lys	ttt Phe	gcc Ala 305	tgc Cys	tct Ser	acc Thr	aag Lys	gca Ala 310	ata Ile	gga Gly	aga Arg	acc Thr	atc Ile 315	ttg Leu	962
aaa Lys	gag Glu	aat Asn	atc Ile 320	aag Lys	tac Tyr	gaa Glu	gtg Val	gcc Ala 325	att Ile	ttt Phe	gtc Val	cat His	gga Gly 330	cca Pro	act Thr	1010
act Thr	gtg Val	gag Glu 335	tcg Ser	cac His	gga Gly	aac Asn	tac Tyr 340	tcc Ser	aca Thr	cag Gln	gtt Val	gga Gly 345	gcc Ala	act Thr	cag Gln	1058
gca	ggg	aga	ttc	agc	atc	act	cct	gcg	gcg	cct	tca	tac	aca	cta	aag	1106

Ala	Gly	Arg	Phe	Ser	Ile	Thr	Pro	Ala	Ala	Pro	Ser	Tyr	Thr	Leu	Lys	
	350					355					360					
ctt	gga	gaa	tat	gga	gag	gtg	aca	gtg	gac	tgt	gaa	cca	cgg	tca	ggg	1154
Leu	Gly	Glu	Tyr	Gly	Glu	Val	Thr	Val	Asp	Cys	Glu	Pro	Arg	Ser	Gly	
365					370					375					380	
att	gac	acc	aat	gca	tac	tac	gtg	atg	act	ggt	gga	aca	aag	acg	ttc	1202
Ile	Asp	Thr	Asn	Ala	Tyr	Tyr	Val	Met	Thr	Val	Gly	Thr	Lys	Thr	Phe	
				385					390					395		
ttg	gtc	cat	cgt	gag	tgg	ttc	atg	gac	ctc	aac	ctc	cct	tgg	agc	agt	1250
Leu	Val	His	Arg	Glu	Trp	Phe	Met	Asp	Leu	Asn	Leu	Pro	Trp	Ser	Ser	
			400					405					410			
gct	gga	agt	act	gtg	tgg	agg	aac	aga	gag	acg	tta	atg	gag	ttt	gag	1298
Ala	Gly	Ser	Thr	Val	Trp	Arg	Asn	Arg	Glu	Thr	Leu	Met	Glu	Phe	Glu	
		415					420					425				
gaa	cca	cac	gcc	acg	aag	cag	tct	gtg	ata	gca	ttg	ggc	tca	caa	gag	1346
Glu	Pro	His	Ala	Thr	Lys	Gln	Ser	Val	Ile	Ala	Leu	Gly	Ser	Gln	Glu	
	430					435					440					
gga	gct	ctg	cat	caa	gct	ttg	gct	gga	gcc	att	cct	gtg	gaa	ttt	tca	1394
Gly	Ala	Leu	His	Gln	Ala	Leu	Ala	Gly	Ala	Ile	Pro	Val	Glu	Phe	Ser	
445					450					455					460	
agc	aac	act	gtc	aag	ttg	acg	tcg	ggt	cat	ttg	aag	tgt	aga	gtg	aag	1442
Ser	Asn	Thr	Val	Lys	Leu	Thr	Ser	Gly	His	Leu	Lys	Cys	Arg	Val	Lys	
				465					470					475		
atg	gaa	aaa	ttg	cag	ttg	aag	gga	aca	acc	tat	ggc	gtc	tgt	tca	aag	1490
Met	Glu	Lys	Leu	Gln	Leu	Lys	Gly	Thr	Thr	Tyr	Gly	Val	Cys	Ser	Lys	
			480					485					490			
gct	ttc	aag	ttt	ctt	ggg	act	ccc	gca	gac	aca	ggt	cac	ggc	act	gtg	1538
Ala	Phe	Lys	Phe	Leu	Gly	Thr	Pro	Ala	Asp	Thr	Gly	His	Gly	Thr	Val	
		495					500					505				
gtg	ttg	gaa	ttg	cag	tac	act	ggc	acg	gat	gga	cct	tgc	aaa	gtt	cct	1586
Val	Leu	Glu	Leu	Gln	Tyr	Thr	Gly	Thr	Asp	Gly	Pro	Cys	Lys	Val	Pro	
	510					515					520					
atc	tcg	tca	gcg	gct	tca	ttg	aac	gac	cta	acg	cca	gtg	ggc	aga	ttg	1634
Ile	Ser	Ser	Ala	Ala	Ser	Leu	Asn	Asp	Leu	Thr	Pro	Val	Gly	Arg	Leu	
					530					535					540	
gtc	act	gtc	aac	cct	ttt	gtt	tca	gtg	gcc	acg	gcc	aac	gct	aag	gtc	1682
Val	Thr	Val	Asn	Pro	Phe	Val	Ser	Val	Ala	Thr	Ala	Asn	Ala	Lys	Val	
				545					550					555		
ctg	att	gaa	ttg	gaa	cca	ccc	ttt	gga	gac	tca	tac	ata	gtg	gtg	ggc	1730
Leu	Ile	Glu	Leu	Glu	Pro	Pro	Phe	Gly	Asp	Ser	Tyr	Ile	Val	Val	Gly	
			560					565					570			
aga	gga	gaa	caa	cag	atc	aat	cac	cat	tgg	cac	aag	tct	gga	agc	agc	1778
Arg	Gly	Glu	Gln	Gln	Ile	Asn	His	His	Trp	His	Lys	Ser	Gly	Ser	Ser	
		575					580					585				
att	ggc	aaa	gcc	ttt	aca	acc	acc	ctc	aaa	gga	gcg	cag	aga	cta	gcc	1826
Ile	Gly	Lys	Ala	Phe	Thr	Thr	Thr	Leu	Lys	Gly	Ala	Gln	Arg	Leu	Ala	
	590					595					600					
gct	cta	gga	gac	aca	gct	tgg	gac	ttt	gga	tca	gtt	gga	ggg	gtg	ttc	1874
Ala	Leu	Gly	Asp	Thr	Ala	Trp	Asp	Phe	Gly	Ser	Val	Gly	Gly	Val	Phe	

605	610	615	620	
acc tca gtt ggg aag gct gtc cat caa gtg ttc gga gga gca ttc cgc				1922
Thr Ser Val Gly Lys Ala Val His Gln Val Phe Gly Gly Ala Phe Arg	625	630	635	
tca ctg ttc gga ggc atg tcc tgg ata acg caa gga ttg ctg ggg gct				1970
Ser Leu Phe Gly Gly Met Ser Trp Ile Thr Gln Gly Leu Leu Gly Ala	640	645	650	
ctc ctg ttg tgg atg ggc atc aat gct cgt gat agg tcc ata gct ctc				2018
Leu Leu Leu Trp Met Gly Ile Asn Ala Arg Asp Arg Ser Ile Ala Leu	655	660	665	
acg ttt ctc gca gtt gga gga gtt ctg ctc ttc ctc tcc gtg aac gtg				2066
Thr Phe Leu Ala Val Gly Gly Val Leu Leu Phe Leu Ser Val Asn Val	670	675	680	
cac gct taatttttat ctaga				2087
His Ala				
685				

<210> 59
 <211> 686
 <212> PRT
 <213> West Nile virus

<400> 59
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 Gly Ala Val Thr Leu Ser Asn Phe Gln Gly Lys Val Met Met Thr Val
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 Asn Ala Thr Asp Val Thr Asp Val Ile Thr Ile Pro Thr Ala Ala Gly
 35 40 45
 Lys Asn Leu Cys Ile Val Arg Ala Met Asp Val Gly Tyr Met Cys Asp
 50 55 60
 Asp Thr Ile Thr Tyr Glu Cys Pro Val Leu Ser Ala Gly Asn Asp Pro
 65 70 75 80
 Glu Asp Ile Asp Cys Trp Cys Thr Lys Ser Ala Val Tyr Val Arg Tyr
 85 90 95
 Gly Arg Cys Thr Lys Thr Arg His Ser Arg Arg Ser Arg Arg Ser Leu
 100 105 110
 Thr Val Gln Thr His Gly Glu Ser Thr Leu Ala Asn Lys Lys Gly Ala
 115 120 125
 Trp Met Asp Ser Thr Lys Ala Thr Arg Tyr Leu Val Lys Thr Glu Ser
 130 135 140
 Trp Ile Leu Arg Asn Pro Gly Tyr Ala Leu Val Ala Ala Val Ile Gly
 145 150 155 160
 Trp Met Leu Gly Ser Asn Thr Met Gln Arg Val Val Phe Val Val Leu
 165 170 175
 Leu Leu Leu Val Ala Pro Ala Tyr Ser Phe Asn Cys Leu Gly Met Ser
 180 185 190

Asn Arg Asp Phe Leu Glu Gly Val Ser Gly Ala Thr Trp Val Asp Leu
 195 200 205
 Val Leu Glu Gly Asp Ser Cys Val Thr Ile Met Ser Lys Asp Lys Pro
 210 215 220
 Thr Ile Asp Val Lys Met Met Asn Met Glu Ala Ala Asn Leu Ala Glu
 225 230 235 240
 Val Arg Ser Tyr Cys Tyr Leu Ala Thr Val Ser Asp Leu Ser Thr Lys
 245 250 255
 Ala Ala Cys Pro Thr Met Gly Glu Ala His Asn Asp Lys Arg Ala Asp
 260 265 270
 Pro Ala Phe Val Cys Arg Gln Gly Val Val Asp Arg Gly Trp Gly Asn
 275 280 285
 Gly Cys Gly Leu Phe Gly Lys Gly Ser Ile Asp Thr Cys Ala Lys Phe
 290 295 300
 Ala Cys Ser Thr Lys Ala Ile Gly Arg Thr Ile Leu Lys Glu Asn Ile
 305 310 315 320
 Lys Tyr Glu Val Ala Ile Phe Val His Gly Pro Thr Thr Val Glu Ser
 325 330 335
 His Gly Asn Tyr Ser Thr Gln Val Gly Ala Thr Gln Ala Gly Arg Phe
 340 345 350
 Ser Ile Thr Pro Ala Ala Pro Ser Tyr Thr Leu Lys Leu Gly Glu Tyr
 355 360 365
 Gly Glu Val Thr Val Asp Cys Glu Pro Arg Ser Gly Ile Asp Thr Asn
 370 375 380
 Ala Tyr Tyr Val Met Thr Val Gly Thr Lys Thr Phe Leu Val His Arg
 385 390 395 400
 Glu Trp Phe Met Asp Leu Asn Leu Pro Trp Ser Ser Ala Gly Ser Thr
 405 410 415
 Val Trp Arg Asn Arg Glu Thr Leu Met Glu Phe Glu Glu Pro His Ala
 420 425 430
 Thr Lys Gln Ser Val Ile Ala Leu Gly Ser Gln Glu Gly Ala Leu His
 435 440 445
 Gln Ala Leu Ala Gly Ala Ile Pro Val Glu Phe Ser Ser Asn Thr Val
 450 455 460
 Lys Leu Thr Ser Gly His Leu Lys Cys Arg Val Lys Met Glu Lys Leu
 465 470 475 480
 Gln Leu Lys Gly Thr Thr Tyr Gly Val Cys Ser Lys Ala Phe Lys Phe
 485 490 495
 Leu Gly Thr Pro Ala Asp Thr Gly His Gly Thr Val Val Leu Glu Leu
 500 505 510
 Gln Tyr Thr Gly Thr Asp Gly Pro Cys Lys Val Pro Ile Ser Ser Ala
 515 520 525
 Ala Ser Leu Asn Asp Leu Thr Pro Val Gly Arg Leu Val Thr Val Asn

530	535	540
Pro Phe Val Ser Val Ala Thr Ala Asn Ala Lys Val Leu Ile Glu Leu 545 550 555 560		
Glu Pro Pro Phe Gly Asp Ser Tyr Ile Val Val Gly Arg Gly Glu Gln 565 570 575		
Gln Ile Asn His His Trp His Lys Ser Gly Ser Ser Ile Gly Lys Ala 580 585 590		
Phe Thr Thr Thr Leu Lys Gly Ala Gln Arg Leu Ala Ala Leu Gly Asp 595 600 605		
Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Val Phe Thr Ser Val Gly 610 615 620		
Lys Ala Val His Gln Val Phe Gly Gly Ala Phe Arg Ser Leu Phe Gly 625 630 635 640		
Gly Met Ser Trp Ile Thr Gln Gly Leu Leu Gly Ala Leu Leu Leu Trp 645 650 655		
Met Gly Ile Asn Ala Arg Asp Arg Ser Ile Ala Leu Thr Phe Leu Ala 660 665 670		
Val Gly Gly Val Leu Leu Phe Leu Ser Val Asn Val His Ala 675 680 685		

<210> 60
 <211> 6928
 <212> DNA
 <213> West Nile virus

<220>
 <221> CDS
 <222> (2005)..(4059)

<400> 60
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 cactcattag gcaccccagg ctttacctt tatgcttccg gctcgtatgt tgtgtggaat 180
 tgtgagcgga taacaatttc acacaggaaa cagctatgac catgattacg aattgcggcc 240
 gcaattctga atgttaaag ttatactttg gatgaagcta taaatatgca ttggaaaaat 300
 aatccattta aagaaaggat tcaaatacta caaaacctaa gcgataatat gttaactaag 360
 cttattctta acgacgcttt aaatatacac aaataaacat aatttttgta taacctaaca 420
 aataactaaa acataaaaat aataaaagga aatgtaatat cgtaattatt ttactcagga 480
 atgggggttaa atatttatat cacgtgtata tctatactgt tatcgtatac tctttacaat 540
 tactattacg aatatgcaag agataataag attacgtatt taagagaatc ttgtcatgat 600
 aattgggtac gacatagtga taaatgctat ttcgcatcgt tacataaagt cagttggaaa 660
 gatggatttg acagatgtaa cttaataggt gcaaaaatgt taaataacag cattctatcg 720

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atattcgtaa	aagatgaaga	ttactgcgaa	tttgtaaact	atgacaataa	aaagccattt	840
atctcaacga	catcgtgtaa	ttcttccatg	ttttatgtat	gtgttttcaga	tattatgaga	900
ttactataaa	ctttttgtat	acttatattc	cgtaaactat	attaatcatg	aagaaaatga	960
aaaagtatag	aagctgttca	cgagcggttg	ttgaaaacaa	caaaattata	cattcaagat	1020
ggcttacata	tacgtctgtg	aggctatcat	ggataatgac	aatgcatctc	taaataggtt	1080
tttggacaat	ggattcgacc	ctaacacgga	atatggtact	ctacaatctc	ctcttgaaat	1140
ggctgtaatg	ttcaagaata	ccgaggctat	aaaaatcttg	atgagggtatg	gagctaaacc	1200
tgtagttact	gaatgcacaa	cttcttgtct	gcatgatgcg	gtgttgagag	acgactacaa	1260
aatagtghaa	gatctgttga	agaataacta	tgtaaacaat	gttctttaca	gcggagggtt	1320
tactcctttg	tgtttggcag	cttaccttaa	caaagttaat	ttggttaaac	ttctattggc	1380
tcattcggcg	gatgtagata	tttcaaacac	ggatcggtta	actcctctac	atatagccgt	1440
atcaaataaa	aatttaacaa	tggttaaact	tctattgaac	aaaggtgctg	atactgactt	1500
gctggataac	atgggatgta	ctcctttaat	gatcgcgtga	caatctggaa	atattgaaat	1560
atgtagcaca	ctacttaaaa	aaaataaaat	gtccagaact	gggaaaaatt	gatcttgcca	1620
gctgtaattc	atggtagaaa	agaagtgtc	aggctacttt	tcaacaaagg	agcagatgta	1680
aactacatct	ttgaaagaaa	tggaaaatca	tatactgttt	tgggaattgat	taaagaaagt	1740
tactctgaga	cacaaaagag	gtagctgaag	tggtactctc	aaaggtacgt	gactaattag	1800
ctataaaaaag	gatccggggt	aattaattag	tcatcaggca	gggcgagaac	gagactatct	1860
gctcgtaaat	taattagagc	ttctttattc	tatacttaaa	aagtgaaaat	aaatacaaag	1920
gttcttgagg	gttgtgttaa	attgaaagcg	agaaataatc	ataaattatt	tcattatcgc	1980
gatatccggt	aagtttgtat	cgta	atg acc gga att gca gtc atg att ggc			2031
		Met	Thr Gly Ile Ala Val			
		1		5		
ctg atc gcc agc gta gga gcg gtt acc ctc tct aac ttc caa ggg aag						2079
Leu Ile Ala Ser Val Gly Ala Val Thr Leu Ser Asn Phe Gln Gly Lys						
10 15 20 25						
gtg atg atg acg gta aat gct act gac gtc aca gat gtc atc acg att						2127
Val Met Met Thr Val Asn Ala Thr Asp Val Thr Asp Val Ile Thr Ile						
30 35 40						
cca aca gct gct gga aag aac cta tgc att gtc aga gca atg gat gtg						2175
Pro Thr Ala Ala Gly Lys Asn Leu Cys Ile Val Arg Ala Met Asp Val						
45 50 55						
gga tac atg tgc gat gat act atc act tat gaa tgc cca gtg ctg tcg						2223
Gly Tyr Met Cys Asp Asp Thr Ile Thr Tyr Glu Cys Pro Val Leu Ser						
60 65 70						
gct ggt aat gat cca gaa gac atc gac tgt tgg tgc aca aag tca gca						2271
Ala Gly Asn Asp Pro Glu Asp Ile Asp Cys Trp Cys Thr Lys Ser Ala						
75 80 85						

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agt Ser	cgg Arg	agg Arg	tca Ser	ctg Leu 110	aca Thr	gtg Val	cag Gln	aca Thr	cac His 115	gga Gly	gaa Glu	agc Ser	act Thr	cta Leu 120	gcg Ala	2367
aac Asn	aag Lys	aag Lys	ggg Gly 125	gct Ala	tgg Trp	atg Met	gac Asp	agc Ser 130	acc Thr	aag Lys	gcc Ala	aca Thr	agg Arg 135	tat Tyr	ttg Leu	2415
gta Val	aaa Lys	aca Thr 140	gaa Glu	tca Ser	tgg Trp	atc Ile	ttg Leu 145	agg Arg	aac Asn	cct Pro	gga Gly	tat Tyr 150	gcc Ala	ctg Leu	gtg Val	2463
gca Ala 155	gcc Ala	gtc Val	att Ile	ggt Gly	tgg Trp	atg Met 160	ctt Leu	ggg Gly	agc Ser	aac Asn	acc Thr 165	atg Met	cag Gln	aga Arg	gtt Val	2511
gtg Val 170	ttt Phe	gtc Val	gtg Val	cta Leu	ttg Leu 175	ctt Leu	ttg Leu	gtg Val	gcc Ala	cca Pro 180	gct Ala	tac Tyr	agc Ser	ttc Phe	aac Asn 185	2559
tgc Cys	ctt Leu	gga Gly	atg Met	agc Ser 190	aac Asn	aga Arg	gac Asp	ttc Phe	ttg Leu 195	gaa Glu	gga Gly	gtg Val	tct Ser	gga Gly 200	gca Ala	2607
aca Thr	tgg Trp	gtg Val	gat Asp 205	ttg Leu	gtt Val	ctc Leu	gaa Glu	ggc Gly 210	gac Asp	agc Ser	tgc Cys	gtg Val	act Thr 215	atc Ile	atg Met	2655
tct Ser	aag Lys	gac Asp 220	aag Lys	cct Pro	acc Thr	atc Ile	gat Asp 225	gtg Val	aag Lys	atg Met	atg Met	aat Asn 230	atg Met	gag Glu	gcg Ala	2703
gcc Ala 235	aac Asn	ctg Leu	gca Ala	gag Glu	gtc Val	cgc Arg 240	agt Ser	tat Tyr	tgc Cys	tat Tyr	ttg Leu 245	gct Ala	acc Thr	gtc Val	agc Ser	2751
gat Asp 250	ctc Leu	tcc Ser	acc Thr	aaa Lys	gct Ala 255	gcg Ala	tgc Cys	ccg Pro	acc Thr 260	atg Met	gga Gly	gaa Glu	gct Ala	cac His	aat Asn 265	2799
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act Thr 330	act Thr	gtg Val	gag Glu	tcg Ser	cac His 335	gga Gly	aac Asn	tac Tyr	tcc Ser	aca Thr 340	cag Gln	gtt Val	gga Gly	gcc Ala	act Thr 345	3039

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gag Glu	gaa Glu	cca Pro	cac His	gcc Ala 430	acg Thr	aag Lys	cag Gln	tct Ser	gtg Val 435	ata Ile	gca Ala	ttg Leu	ggc Gly	tca Ser 440	caa Gln	3327
gag Glu	gga Gly	gct Ala	ctg Leu 445	cat His	caa Gln	gct Ala	ttg Leu	gct Ala 450	gga Gly	gcc Ala	att Ile	cct Pro	gtg Val 455	gaa Glu	ttt Phe	3375
tca Ser	agc Ser	aac Asn 460	act Thr	gtc Val	aag Lys	ttg Leu	acg Thr 465	tcg Ser	ggt Gly	cat His	ttg Leu	aag Lys 470	tgt Cys	aga Arg	gtg Val	3423
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agc Ser	att Ile	ggc Gly	aaa Lys	gcc Ala 590	ttt Phe	aca Thr	acc Thr	acc Thr	ctc Leu 595	aaa Lys	gga Gly	gcg Ala	cag Gln	aga Arg 600	cta Leu	3807
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 <212> PRT
 <213> West Nile virus

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 Thr Asp Val₃₅ Thr Asp Val Ile Thr₄₀ Ile Pro Thr Ala₄₅ Gly Lys Asn
 Leu Cys₅₀ Ile Val Arg Ala Met₅₅ Asp Val Gly Tyr Met₆₀ Cys Asp Asp Thr
 Ile Thr Tyr Glu Cys₆₅ Pro₇₀ Val Leu Ser Ala Gly₇₅ Asn Asp Pro Glu Asp₈₀
 Ile Asp Cys Trp Cys₈₅ Thr Lys Ser Ala Val₉₀ Tyr Val Arg Tyr Gly₉₅ Arg
 Cys Thr Lys Thr₁₀₀ Arg His Ser Arg Arg₁₀₅ Ser Arg Arg Ser Leu₁₁₀ Thr Val
 Gln Thr His₁₁₅ Gly Glu Ser Thr Leu₁₂₀ Ala Asn Lys Lys Gly₁₂₅ Ala Trp Met
 Asp Ser₁₃₀ Thr Lys Ala Thr Arg₁₃₅ Tyr Leu Val Lys Thr₁₄₀ Glu Ser Trp Ile
 Leu Arg Asn Pro Gly Tyr₁₅₀ Ala Leu Val Ala₁₅₅ Val Ile Gly Trp Met₁₆₀
 Leu Gly Ser Asn Thr₁₆₅ Met Gln Arg Val₁₇₀ Val Phe Val Val Leu₁₇₅ Leu Leu
 Leu Val Ala Pro₁₈₀ Ala Tyr Ser Phe Asn₁₈₅ Cys Leu Gly Met Ser₁₉₀ Asn Arg
 Asp Phe Leu₁₉₅ Glu Gly Val Ser Gly₂₀₀ Ala Thr Trp Val Asp₂₀₅ Leu Val Leu
 Glu Gly₂₁₀ Asp Ser Cys Val Thr₂₁₅ Ile Met Ser Lys Asp₂₂₀ Lys Pro Thr Ile
 Asp Val₂₂₅ Lys Met Met Asn₂₃₀ Met Glu Ala Ala Asn₂₃₅ Leu Ala Glu Val Arg₂₄₀
 Ser Tyr Cys Tyr Leu₂₄₅ Ala Thr Val Ser Asp₂₅₀ Leu Ser Thr Lys Ala₂₅₅ Ala
 Cys Pro Thr Met₂₆₀ Gly Glu Ala His Asn₂₆₅ Asp Lys Arg Ala Asp₂₇₀ Pro Ala
 Phe Val Cys₂₇₅ Arg Gln Gly Val Val₂₈₀ Asp Arg Gly Trp Gly₂₈₅ Asn Gly Cys
 Gly Leu₂₉₀ Phe Gly Lys Gly Ser₂₉₅ Ile Asp Thr Cys Ala₃₀₀ Lys Phe Ala Cys
 Ser Thr Lys Ala Ile Gly₃₁₀ Arg Thr Ile Leu Lys₃₁₅ Glu Asn Ile Lys Tyr₃₂₀
 Glu Val Ala Ile Phe₃₂₅ Val His Gly Pro Thr₃₃₀ Thr Val Glu Ser His Gly₃₃₅
 Asn Tyr Ser Thr₃₄₀ Gln Val Gly Ala Thr₃₄₅ Gln Ala Gly Arg Phe₃₅₀ Ser Ile
 Thr Pro Ala₃₅₅ Ala Pro Ser Tyr Thr₃₆₀ Leu Lys Leu Gly Glu₃₆₅ Tyr Gly Glu

Val	Thr	Val	Asp	Cys	Glu	Pro	Arg	Ser	Gly	Ile	Asp	Thr	Asn	Ala	Tyr
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Tyr	Val	Met	Thr	Val	Gly	Thr	Lys	Thr	Phe	Leu	Val	His	Arg	Glu	Trp
385					390					395					400
Phe	Met	Asp	Leu	Asn	Leu	Pro	Trp	Ser	Ser	Ala	Gly	Ser	Thr	Val	Trp
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Arg	Asn	Arg	Glu	Thr	Leu	Met	Glu	Phe	Glu	Glu	Pro	His	Ala	Thr	Lys
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Gln	Ser	Val	Ile	Ala	Leu	Gly	Ser	Gln	Glu	Gly	Ala	Leu	His	Gln	Ala
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Leu	Ala	Gly	Ala	Ile	Pro	Val	Glu	Phe	Ser	Ser	Asn	Thr	Val	Lys	Leu
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Thr	Ser	Gly	His	Leu	Lys	Cys	Arg	Val	Lys	Met	Glu	Lys	Leu	Gln	Leu
465					470					475					480
Lys	Gly	Thr	Thr	Tyr	Gly	Val	Cys	Ser	Lys	Ala	Phe	Lys	Phe	Leu	Gly
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Thr	Pro	Ala	Asp	Thr	Gly	His	Gly	Thr	Val	Val	Leu	Glu	Leu	Gln	Tyr
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Thr	Gly	Thr	Asp	Gly	Pro	Cys	Lys	Val	Pro	Ile	Ser	Ser	Ala	Ala	Ser
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Leu	Asn	Asp	Leu	Thr	Pro	Val	Gly	Arg	Leu	Val	Thr	Val	Asn	Pro	Phe
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Val	Ser	Val	Ala	Thr	Ala	Asn	Ala	Lys	Val	Leu	Ile	Glu	Leu	Glu	Pro
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Pro	Phe	Gly	Asp	Ser	Tyr	Ile	Val	Val	Gly	Arg	Gly	Glu	Gln	Gln	Ile
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Asn	His	His	Trp	His	Lys	Ser	Gly	Ser	Ser	Ile	Gly	Lys	Ala	Phe	Thr
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Thr	Thr	Leu	Lys	Gly	Ala	Gln	Arg	Leu	Ala	Ala	Leu	Gly	Asp	Thr	Ala
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Trp	Asp	Phe	Gly	Ser	Val	Gly	Gly	Val	Phe	Thr	Ser	Val	Gly	Lys	Ala
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Val	His	Gln	Val	Phe	Gly	Gly	Ala	Phe	Arg	Ser	Leu	Phe	Gly	Gly	Met
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Ser	Trp	Ile	Thr	Gln	Gly	Leu	Leu	Gly	Ala	Leu	Leu	Leu	Trp	Met	Gly
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Ile	Asn	Ala	Arg	Asp	Arg	Ser	Ile	Ala	Leu	Thr	Phe	Leu	Ala	Val	Gly
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								Met 1		Ser	Lys	Lys	Pro 5	Gly			
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Gly	Pro	Gly	Lys 10	Ser	Arg	Ala	Val	Asn 15	Met	Leu	Lys	Arg	Gly 20	Met	Pro		
cgc	gtg	ttg	tcc	ttg	att	gga	ctg	aag	agg	gct	atg	ttg	agc	ctg	atc	210	
Arg	Val	Leu 25	Ser	Leu	Ile	Gly	Leu 30	Lys	Arg	Ala	Met	Leu 35	Ser	Leu	Ile		
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Asp	Gly 40	Lys	Gly	Pro	Ile	Arg 45	Phe	Val	Leu	Ala	Leu 50	Leu	Ala	Phe	Phe		
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Arg 55	Phe	Thr	Ala	Ile	Ala 60	Pro	Thr	Arg	Ala	Val 65	Leu	Asp	Arg	Trp	Arg 70		
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Gly	Val	Asn	Lys	Gln 75	Thr	Ala	Met	Lys	His 80	Leu	Leu	Ser	Phe	Lys 85	Lys		
gaa	cta	ggg	acc	ttg	acc	agt	gct	atc	aat	cgg	cgg	agc	tca	aaa	caa	402	
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Met 135	Thr	Val	Asn	Ala	Thr 140	Asp	Val	Thr	Asp	Val 145	Ile	Thr	Ile	Pro	Thr 150		
gct	gct	gga	aag	aac	cta	tgc	att	gtc	aga	gca	atg	gat	gtg	gga	tac	594	
Ala	Ala	Gly	Lys	Asn 155	Leu	Cys	Ile	Val	Arg 160	Ala	Met	Asp	Val	Gly 165	Tyr		
atg	tgc	gat	gat	act	atc	act	tat	gaa	tgc	cca	gtg	ctg	tcg	gct	ggc	642	
Met	Cys	Asp	Asp 170	Thr	Ile	Thr	Tyr	Glu 175	Cys	Pro	Val	Leu	Ser 180	Ala	Gly		
aat	gat	cca	gaa	gac	atc	gac	tgt	tgg	tgc	aca	aag	tca	gca	gtc	tac	690	
Asn	Asp	Pro 185	Glu	Asp	Ile	Asp	Cys 190	Trp	Cys	Thr	Lys	Ser 195	Ala	Val	Tyr		

gtc Val	agg Arg 200	tat Tyr	gga Gly	aga Arg	tgc Cys 205	acc Thr	aag Lys	aca Thr	cgc Arg	cac His	tca Ser 210	aga Arg	cgc Arg	agt Ser	cgg Arg	738
agg Arg 215	tca Ser	ctg Leu	aca Thr	gtg Val	cag Gln 220	aca Thr	cac His	gga Gly	gaa Glu	agc Ser 225	act Thr	cta Leu	gcg Ala	aac Asn	aag Lys 230	786
aag Lys	ggg Gly	gct Ala	tgg Trp	atg Met 235	gac Asp	agc Ser	acc Thr	aag Lys	gcc Ala 240	aca Thr	agg Arg	tat Tyr	ttg Leu	gta Val 245	aaa Lys	834
aca Thr	gaa Glu	tca Ser	tgg Trp 250	atc Ile	ttg Leu	agg Arg	aac Asn	cct Pro 255	gga Gly	tat Tyr	gcc Ala	ctg Leu	gtg Val 260	gca Ala	gcc Ala	882
gtc Val	att Ile	ggt Gly 265	tgg Trp	atg Met	ctt Leu	ggg Gly	agc Ser 270	aac Asn	acc Thr	atg Met	cag Gln 275	aga Arg	gtt Val	gtg Val	ttt Phe	930
gtc Val	gtg Val 280	cta Leu	ttg Leu	ctt Leu	ttg Leu	gtg Val 285	gcc Ala	cca Pro	gct Ala	tac Tyr	agc Ser 290	ttc Phe	aac Asn	tgc Cys	ctt Leu	978
gga Gly 295	atg Met	agc Ser	aac Asn	aga Arg	gac Asp 300	ttc Phe	ttg Leu	gaa Glu	gga Gly	gtg Val 305	tct Ser	gga Gly	gca Ala	aca Thr	tgg Trp 310	1026
gtg Val	gat Asp	ttg Leu	gtt Val	ctc Leu 315	gaa Glu	ggc Gly	gac Asp	agc Ser	tgc Cys 320	gtg Val	act Thr	atc Ile	atg Met	tct Ser 325	aag Lys	1074
gac Asp	aag Lys	cct Pro	acc Thr 330	atc Ile	gat Asp	gtg Val	aag Lys	atg Met 335	atg Met	aat Asn	atg Met	gag Glu	gcg Ala 340	gcc Ala	aac Asn	1122
ctg Leu	gca Ala	gag Glu 345	gtc Val	cgc Arg	agt Ser	tat Tyr	tgc Cys 350	tat Tyr	ttg Leu	gct Ala	acc Thr	gtc Val 355	agc Ser	gat Asp	ctc Leu	1170
tcc Ser	acc Thr 360	aaa Lys	gct Ala	gcg Ala	tgc Cys	ccg Pro 365	acc Thr	atg Met	gga Gly	gaa Glu	gct Ala 370	cac His	aat Asn	gac Asp	aaa Lys	1218
cgt Arg 375	gct Ala	gac Asp	cca Pro	gct Ala	ttt Phe 380	gtg Val	tgc Cys	aga Arg	caa Gln	gga Gly 385	gtg Val	gtg Val	gac Asp	agg Arg	ggc Gly 390	1266
tgg Trp	ggc Gly	aac Asn	ggc Gly	tgc Cys 395	gga Gly	cta Leu	ttt Phe	ggc Gly	aaa Lys 400	gga Gly	agc Ser	att Ile	gac Asp	aca Thr 405	tgc Cys	1314
gcc Ala	aaa Lys	ttt Phe	gcc Ala 410	tgc Cys	tct Ser	acc Thr	aag Lys	gca Ala 415	ata Ile	gga Gly	aga Arg	acc Thr	atc Ile 420	ttg Leu	aaa Lys	1362
gag Glu	aat Asn	atc Ile 425	aag Lys	tac Tyr	gaa Glu	gtg Val	gcc Ala 430	att Ile	ttt Phe	gtc Val	cat His	gga Gly 435	cca Pro	act Thr	act Thr	1410
gtg Val	gag Glu 440	tcg Ser	cac His	gga Gly	aac Asn	tac Tyr 445	tcc Ser	aca Thr	cag Gln	gtt Val	gga Gly 450	gcc Ala	act Thr	cag Gln	gca Ala	1458

ggg Gly 455	aga Arg	ttc Phe	agc Ser	atc Ile	act Thr 460	cct Pro	gcg Ala	gcg Ala	cct Pro	tca Ser 465	tac Tyr	aca Thr	cta Leu	aag Lys	ctt Leu 470	1506
gga Gly	gaa Glu	tat Tyr	gga Gly	gag Glu 475	gtg Val	aca Thr	gtg Val	gac Asp	tgt Cys 480	gaa Glu	cca Pro	cgg Arg	tca Ser	ggg Gly 485	att Ile	1554
gac Asp	acc Thr	aat Asn	gca Ala 490	tac Tyr	tac Tyr	gtg Val	atg Met	act Thr 495	gtt Val	gga Gly	aca Thr	aag Lys	acg Thr 500	ttc Phe	ttg Leu	1602
gtc Val	cat His	cgt Arg 505	gag Glu	tgg Trp	ttc Phe	atg Met	gac Asp 510	ctc Leu	aac Asn	ctc Leu	cct Pro	tgg Trp 515	agc Ser	agt Ser	gct Ala	1650
gga Gly	agt Ser 520	act Thr	gtg Val	tgg Trp	agg Arg	aac Asn 525	aga Arg	gag Glu	acg Thr	tta Leu	atg Met 530	gag Glu	ttt Phe	gag Glu	gaa Glu	1698
cca Pro 535	cac His	gcc Ala	acg Thr	aag Lys	cag Gln 540	tct Ser	gtg Val	ata Ile	gca Ala	ttg Leu 545	ggc Gly	tca Ser	caa Gln	gag Glu	gga Gly 550	1746
gct Ala	ctg Leu	cat His	caa Gln	gct Ala 555	ttg Leu	gct Ala	gga Gly	gcc Ala	att Ile 560	cct Pro	gtg Val	gaa Glu	ttt Phe	tca Ser 565	agc Ser	1794
aac Asn	act Thr	gtc Val	aag Lys 570	ttg Leu	acg Thr	tcg Ser	ggt Gly	cat His 575	ttg Leu	aag Lys	tgt Cys	aga Arg	gtg Val 580	aag Lys	atg Met	1842
gaa Glu	aaa Lys	ttg Leu 585	cag Gln	ttg Leu	aag Lys	gga Gly	aca Thr 590	acc Thr	tat Tyr	ggc Gly	gtc Val	tgt Cys 595	tca Ser	aag Lys	gct Ala	1890
ttc Phe 600	aag Lys	ttt Phe	ctt Leu	ggg Gly	act Thr	ccc Pro 605	gca Ala	gac Asp	aca Thr	ggt Gly	cac His 610	ggc Gly	act Thr	gtg Val	gtg Val	1938
ttg Leu 615	gaa Glu	ttg Leu	cag Gln	tac Tyr	act Thr 620	ggc Gly	acg Thr	gat Asp	gga Gly	cct Pro 625	tgc Cys	aaa Lys	gtt Val	cct Pro	atc Ile 630	1986
tcg Ser	tca Ser	gtg Val	gct Ala	tca Ser 635	ttg Leu	aac Asn	gac Asp	cta Leu	acg Thr 640	cca Pro	gtg Val	ggc Gly	aga Arg	ttg Leu 645	gtc Val	2034
act Thr	gtc Val	aac Asn	cct Pro 650	ttt Phe	gtt Val	tca Ser	gtg Val	gcc Ala 655	acg Thr	gcc Ala	aac Asn	gct Ala 660	aag Lys	gtc Val	ctg Leu	2082
att Ile	gaa Glu	ttg Leu 665	gaa Glu	cca Pro	ccc Pro	ttt Phe	gga Gly 670	gac Asp	tca Ser	tac Tyr	ata Ile	gtg Val 675	gtg Val	ggc Gly	aga Arg	2130
gga Gly 680	gaa Glu	caa Gln	cag Gln	atc Ile	aat Asn	cac His 685	cat His	tgg Trp	cac His	aag Lys	tct Ser 690	gga Gly	agc Ser	agc Ser	att Ile	2178
ggc Gly 695	aaa Lys	gcc Ala	ttt Phe	aca Thr	acc Thr 700	acc Thr	ctc Leu	aaa Lys	gga Gly 705	gcg Ala	cag Gln	aga Arg	cta Leu	gcc Ala	gct Ala 710	2226
cta	gga	gac	aca	gct	tgg	gac	ttt	gga	tca	gtt	gga	ggg	gtg	ttc	acc	2274

Leu	Gly	Asp	Thr	Ala 715	Trp	Asp	Phe	Gly	Ser 720	Val	Gly	Gly	Val	Phe 725	Thr	
tca Ser	ggt Val	ggg Gly	aag Lys 730	gct Ala	gtc Val	cat His	caa Gln	gtg Val 735	ttc Phe	gga Gly	gga Gly	gca Ala	ttc Phe 740	cgc Arg	tca Ser	2322
ctg Leu	ttc Phe	gga Gly 745	ggc Gly	atg Met	tcc Ser	tgg Trp	ata Ile 750	acg Thr	caa Gln	gga Gly	ttg Leu	ctg Leu 755	ggg Gly	gct Ala	ctc Leu	2370
ctg Leu	ttg Leu 760	tgg Trp	atg Met	ggc Gly	atc Ile	aat Asn 765	gct Ala	cgt Arg	gat Asp	agg Arg	tcc Ser 770	ata Ile	gct Ala	ctc Leu	acg Thr	2418
ttt Phe 775	ctc Leu	gca Ala	gtt Val	gga Gly	gga Gly 780	gtt Val	ctg Leu	ctc Leu	ttc Phe	ctc Leu 785	tcc Ser	gtg Val	aac Asn	gtg Val	cac His 790	2466
gct Ala	gac Asp	act Thr	ggg Gly	tgt Cys 795	gcc Ala	ata Ile	gac Asp	atc Ile	agc Ser 800	cgg Arg	caa Gln	gag Glu	ctg Leu	aga Arg 805	tgt Cys	2514
gga Gly	agt Ser	gga Gly	gtg Val 810	ttc Phe	ata Ile	cac His	aat Asn	gat Asp 815	gtg Val	gag Glu	gct Ala	tgg Trp	atg Met 820	gac Asp	cgg Arg	2562
tac Tyr	aag Lys	tat Tyr 825	tac Tyr	cct Pro	gaa Glu	acg Thr	cca Pro 830	caa Gln	ggc Gly	cta Leu	gcc Ala	aag Lys 835	atc Ile	att Ile	cag Gln	2610
aaa Lys	gct Ala 840	cat His	aag Lys	gaa Glu	gga Gly	gtg Val 845	tgc Cys	ggg Gly	cta Leu	cga Arg	tca Ser 850	gtt Val	tcc Ser	aga Arg	ctg Leu	2658
gag Glu 855	cat His	caa Gln	atg Met	tgg Trp	gaa Glu 860	gca Ala	gtg Val	aag Lys	gac Asp	gag Glu 865	ctg Leu	aac Asn	act Thr	ctt Leu	ttg Leu 870	2706
aag Lys	gag Glu	aat Asn	ggg Gly	gtg Val 875	gac Asp	ctt Leu	agt Ser	gtc Val	gtg Val 880	gtt Val	gag Glu	aaa Lys	cag Gln	gag Glu 885	gga Gly	2754
atg Met	tac Tyr	aag Lys	tca Ser 890	gca Ala	cct Pro	aaa Lys	cgc Arg	ctc Leu 895	acc Thr	gcc Ala	acc Thr	acg Thr	gaa Glu 900	aaa Lys	ttg Leu	2802
gaa Glu	att Ile	ggc Gly 905	tgg Trp	aag Lys	gcc Ala	tgg Trp	gga Gly 910	aag Lys	agt Ser	att Ile	tta Leu	ttt Phe 915	gca Ala	cca Pro	gaa Glu	2850
ctc Leu	gcc Ala 920	aac Asn	aac Asn	acc Thr	ttt Phe	gtg Val 925	gtt Val	gat Asp	ggg Gly	ccg Pro	gag Glu 930	acc Thr	aag Lys	gaa Glu	tgt Cys	2898
ccg Pro 935	act Thr	cag Gln	aat Asn	cgc Arg	gct Ala 940	tgg Trp	aat Asn	agc Ser	tta Leu	gaa Glu 945	gtg Val	gag Glu	gat Asp	ttt Phe	gga Gly 950	2946
ttt Phe	ggg Gly	ctc Leu	acc Thr	agc Ser 955	act Thr	cgg Arg	atg Met	ttc Phe	ctg Leu 960	aag Lys	gtc Val	aga Arg	gag Glu	agc Ser 965	aac Asn	2994
aca Thr	act Thr	gaa Glu	tgt Cys	gac Asp	tcg Ser	aag Lys	atc Ile	att Ile	gga Gly	acg Thr	gct Ala	gtc Val	aag Lys	aac Asn	aac Asn	3042

970					975					980					
ttg gcg atc cac agt gac ctg tcc tat tgg att gaa agc agg ctc aat	3090														
Leu Ala Ile His Ser Asp Leu Ser Tyr Trp Ile Glu Ser Arg Leu Asn															
985	990	995													
gat acg tgg aag ctt gaa agg gca gtt ctg ggt gaa gtc aaa tca tgt	3138														
Asp Thr Trp Lys Leu Glu Arg Ala Val Leu Gly Glu Val Lys Ser Cys															
1000	1005	1010													
acg tgg cct gag acg cat acc ttg tgg ggc gat gga atc ctt gag agt	3186														
Thr Trp Pro Glu Thr His Thr Leu Trp Gly Asp Gly Ile Leu Glu Ser															
1015	1020	1025		1030											
gac ttg ata ata cca gtc aca ctg gcg gga cca cga agc aat cac aat	3234														
Asp Leu Ile Ile Pro Val Thr Leu Ala Gly Pro Arg Ser Asn His Asn															
	1035	1040		1045											
cgg aga cct ggg tac aag aca caa aac cag ggc cca tgg gac gaa ggc	3282														
Arg Arg Pro Gly Tyr Lys Thr Gln Asn Gln Gly Pro Trp Asp Glu Gly															
	1050	1055		1060											
cgg gta gag att gac ttc gat tac tgc cca gga act acg gtc acc ctg	3330														
Arg Val Glu Ile Asp Phe Asp Tyr Cys Pro Gly Thr Thr Val Thr Leu															
	1065	1070		1075											
agt gag agc tgc gga cac cgt gga cct gcc act cgc acc acc aca gag	3378														
Ser Glu Ser Cys Gly His Arg Gly Pro Ala Thr Arg Thr Thr Thr Glu															
1080	1085	1090													
agc gga aag ttg ata aca gat tgg tgc tgc agg agc tgc acc tta cca	3426														
Ser Gly Lys Leu Ile Thr Asp Trp Cys Cys Arg Ser Cys Thr Leu Pro															
1095	1100	1105		1110											
cca ctg cgc tac caa act gac agc ggc tgt tgg tat ggt atg gag atc	3474														
Pro Leu Arg Tyr Gln Thr Asp Ser Gly Cys Trp Tyr Gly Met Glu Ile															
	1115	1120		1125											
aga cca cag aga cat gat gaa aag acc ctc gtg cag tca caa gtg aat	3522														
Arg Pro Gln Arg His Asp Glu Lys Thr Leu Val Gln Ser Gln Val Asn															
	1130	1135		1140											
gct tat aat gct gat atg att gac cct ttt cag ttg ggc ctt ctg gtc	3570														
Ala Tyr Asn Ala Asp Met Ile Asp Pro Phe Gln Leu Gly Leu Leu Val															
1145	1150	1155													
gtg ttc ttg gcc acc cag gag gtc ctt cgc aag agg tgg aca gcc aag	3618														
Val Phe Leu Ala Thr Gln Glu Val Leu Arg Lys Arg Trp Thr Ala Lys															
1160	1165	1170													
atc agc atg cca gct ata ctg att gct ctg cta gtc ctg gtg ttt ggg	3666														
Ile Ser Met Pro Ala Ile Leu Ile Ala Leu Leu Val Leu Val Phe Gly															
1175	1180	1185		1190											
ggc att act tac act gat gtg tta cgc tat gtc atc ttg gtg ggg gca	3714														
Gly Ile Thr Tyr Thr Asp Val Leu Arg Tyr Val Ile Leu Val Gly Ala															
	1195	1200		1205											
gct ttc gca gaa tct aat tcg gga gga gac gtg gta cac ttg gcg ctc	3762														
Ala Phe Ala Glu Ser Asn Ser Gly Gly Asp Val Val His Leu Ala Leu															
	1210	1215		1220											
atg gcg acc ttc aag ata caa cca gtg ttt atg gtg gca tcg ttt ctc	3810														
Met Ala Thr Phe Lys Ile Gln Pro Val Phe Met Val Ala Ser Phe Leu															
1225	1230	1235													

aaa gcg aga tgg acc aac cag gag aac att ttg ttg atg ttg gcg gct Lys Ala Arg Trp Thr Asn Gln Glu Asn Ile Leu Leu Met Leu Ala Ala 1240 1245 1250	3858
gtt ttc ttt caa atg gct tat cac gat gcc cgc caa att ctg ctc tgg Val Phe Phe Gln Met Ala Tyr His Asp Ala Arg Gln Ile Leu Leu Trp 1255 1260 1265 1270	3906
gag atc cct gat gtg ttg aat tca ctg gcg gta gct tgg atg ata ctg Glu Ile Pro Asp Val Leu Asn Ser Leu Ala Val Ala Trp Met Ile Leu 1275 1280 1285	3954
aga gcc ata aca ttc aca acg aca tca aac gtg gtt gtt ccg ctg cta Arg Ala Ile Thr Phe Thr Thr Thr Ser Asn Val Val Val Pro Leu Leu 1290 1295 1300	4002
gcc ctg cta aca ccc ggg ctg aga tgc ttg aat ctg gat gtg tac agg Ala Leu Leu Thr Pro Gly Leu Arg Cys Leu Asn Leu Asp Val Tyr Arg 1305 1310 1315	4050
ata ctg ctg ttg atg gtc gga ata ggc agc ttg atc agg gag aag agg Ile Leu Leu Leu Met Val Gly Ile Gly Ser Leu Ile Arg Glu Lys Arg 1320 1325 1330	4098
agt gca gct gca aaa aag aaa gga gca agt ctg cta tgc ttg gct cta Ser Ala Ala Ala Lys Lys Lys Gly Ala Ser Leu Leu Cys Leu Ala Leu 1335 1340 1345 1350	4146
gcc tca aca gga ctt ttc aac ccc atg atc ctt gct gct gga ctg att Ala Ser Thr Gly Leu Phe Asn Pro Met Ile Leu Ala Ala Gly Leu Ile 1355 1360 1365	4194
gca tgt gat ccc aac cgt aaa cgc gga tgg ccc gca act gaa gtg atg Ala Cys Asp Pro Asn Arg Lys Arg Gly Trp Pro Ala Thr Glu Val Met 1370 1375 1380	4242
aca gct gtc ggc cta atg ttt gcc atc gtc gga ggg ctg gca gag ctt Thr Ala Val Gly Leu Met Phe Ala Ile Val Gly Gly Leu Ala Glu Leu 1385 1390 1395	4290
gac att gac tcc atg gcc att cca atg act atc gcg ggg ctc atg ttt Asp Ile Asp Ser Met Ala Ile Pro Met Thr Ile Ala Gly Leu Met Phe 1400 1405 1410	4338
gct gct ttc gtg att tct ggg aaa tca aca gat atg tgg att gag aga Ala Ala Phe Val Ile Ser Gly Lys Ser Thr Asp Met Trp Ile Glu Arg 1415 1420 1425 1430	4386
acg gcg gac att tcc tgg gaa agt gat gca gaa att aca ggc tcg agc Thr Ala Asp Ile Ser Trp Glu Ser Asp Ala Glu Ile Thr Gly Ser Ser 1435 1440 1445	4434
gaa aga gtt gat gtg cgg ctt gat gat gat gga aac ttc cag ctc atg Glu Arg Val Asp Val Arg Leu Asp Asp Asp Gly Asn Phe Gln Leu Met 1450 1455 1460	4482
aat gat cca gga gca cct tgg aag ata tgg atg ctc aga atg gtc tgt Asn Asp Pro Gly Ala Pro Trp Lys Ile Trp Met Leu Arg Met Val Cys 1465 1470 1475	4530
ctc gcg att agt gcg tac acc ccc tgg gca atc ttg ccc tca gta gtt Leu Ala Ile Ser Ala Tyr Thr Pro Trp Ala Ile Leu Pro Ser Val Val 1480 1485 1490	4578

gga ttt tgg ata act ctc caa tac aca aag aga gga ggc gtg ttg tgg Gly Phe Trp Ile Thr Leu Gln Tyr Thr Lys Arg Gly Gly Val Leu Trp 1495 1500 1505 1510	4626
gac act ccc tca cca aag gag tac aaa aag ggg gac acg acc acc ggc Asp Thr Pro Ser Pro Lys Glu Tyr Lys Lys Gly Asp Thr Thr Thr Gly 1515 1520 1525	4674
gtc tac agg atc atg act cgt ggg ctg ctc ggc agt tat caa gca gga Val Tyr Arg Ile Met Thr Arg Gly Leu Leu Gly Ser Tyr Gln Ala Gly 1530 1535 1540	4722
gcg ggc gtg atg gtt gaa ggt gtt ttc cac acc ctt tgg cat aca aca Ala Gly Val Met Val Glu Gly Val Phe His Thr Leu Trp His Thr Thr 1545 1550 1555	4770
aaa gga gcc gct ttg atg agc gga gag ggc cgc ctg gac cca tac tgg Lys Gly Ala Ala Leu Met Ser Gly Glu Gly Arg Leu Asp Pro Tyr Trp 1560 1565 1570	4818
ggc agt gtc aag gag gat cga ctt tgt tac gga gga ccc tgg aaa ttg Gly Ser Val Lys Glu Asp Arg Leu Cys Tyr Gly Gly Pro Trp Lys Leu 1575 1580 1585 1590	4866
cag cac aag tgg aac ggg cag gat gag gtg cag atg att gtg gtg gaa Gln His Lys Trp Asn Gly Gln Asp Glu Val Gln Met Ile Val Val Glu 1595 1600 1605	4914
cct ggc aag aac gtt aag aac gtc cag acg aaa cca ggg gtg ttc aaa Pro Gly Lys Asn Val Lys Asn Val Gln Thr Lys Pro Gly Val Phe Lys 1610 1615 1620	4962
aca cct gaa gga gaa atc ggg gcc gtg act ttg gac ttc ccc act gga Thr Pro Glu Gly Glu Ile Gly Ala Val Thr Leu Asp Phe Pro Thr Gly 1625 1630 1635	5010
aca tca ggc tca cca ata gtg gac aaa aac ggt gat gtg att ggg ctt Thr Ser Gly Ser Pro Ile Val Asp Lys Asn Gly Asp Val Ile Gly Leu 1640 1645 1650	5058
tat ggc aat gga gtc ata atg ccc aac ggc tca tac ata agc gcg ata Tyr Gly Asn Gly Val Ile Met Pro Asn Gly Ser Tyr Ile Ser Ala Ile 1655 1660 1665 1670	5106
gtg cag ggt gaa agg atg gat gag cca atc cca gcc gga ttc gaa cct Val Gln Gly Glu Arg Met Asp Glu Pro Ile Pro Ala Gly Phe Glu Pro 1675 1680 1685	5154
gag atg ctg agg aaa aaa cag atc act gta ctg gat ctc cat ccc ggc Glu Met Leu Arg Lys Lys Gln Ile Thr Val Leu Asp Leu His Pro Gly 1690 1695 1700	5202
gcc ggt aaa aca agg agg att ctg cca cag atc atc aaa gag gcc ata Ala Gly Lys Thr Arg Arg Ile Leu Pro Gln Ile Ile Lys Glu Ala Ile 1705 1710 1715	5250
aac aga aga ctg aga aca gcc gtg cta gca cca acc agg gtt gtg gct Asn Arg Arg Leu Arg Thr Ala Val Leu Ala Pro Thr Arg Val Val Ala 1720 1725 1730	5298
gct gag atg gct gaa gca ctg aga gga ctg ccc atc cgg tac cag aca Ala Glu Met Ala Glu Ala Leu Arg Gly Leu Pro Ile Arg Tyr Gln Thr 1735 1740 1745 1750	5346
tcc gca gtg ccc aga gaa cat aat gga aat gag att gtt gat gtc atg	5394

Ser	Ala	Val	Pro	Arg	Glu	His	Asn	Gly	Asn	Glu	Ile	Val	Asp	Val	Met	
			1755						1760					1765		
tgt	cat	gct	acc	ctc	acc	cac	agg	ctg	atg	tct	cct	cac	agg	gtg	ccg	5442
Cys	His	Ala	Thr	Leu	Thr	His	Arg	Leu	Met	Ser	Pro	His	Arg	Val	Pro	
			1770					1775					1780			
aac	tac	aac	ctg	ttc	gtg	atg	gat	gag	gct	cat	ttc	acc	gac	cca	gct	5490
Asn	Tyr	Asn	Leu	Phe	Val	Met	Asp	Glu	Ala	His	Phe	Thr	Asp	Pro	Ala	
		1785					1790					1795				
agc	att	gca	gca	aga	ggt	tac	att	tcc	aca	aag	gtc	gag	cta	ggg	gag	5538
Ser	Ile	Ala	Ala	Arg	Gly	Tyr	Ile	Ser	Thr	Lys	Val	Glu	Leu	Gly	Glu	
	1800					1805					1810					
gcg	gcg	gca	ata	ttc	atg	aca	gcc	acc	cca	cca	ggc	act	tca	gat	cca	5586
Ala	Ala	Ala	Ile	Phe	Met	Thr	Ala	Thr	Pro	Pro	Gly	Thr	Ser	Asp	Pro	
	1815				1820				1825						1830	
ttc	cca	gag	tcc	aat	tca	cca	att	tcc	gac	tta	cag	act	gag	atc	ccg	5634
Phe	Pro	Glu	Ser	Asn	Ser	Pro	Ile	Ser	Asp	Leu	Gln	Thr	Glu	Ile	Pro	
			1835					1840					1845			
gat	cga	gct	tgg	aac	tct	gga	tac	gaa	tgg	atc	aca	gaa	tac	acc	ggg	5682
Asp	Arg	Ala	Trp	Asn	Ser	Gly	Tyr	Glu	Trp	Ile	Thr	Glu	Tyr	Thr	Gly	
		1850					1855					1860				
aag	acg	gtt	tgg	ttt	gtg	cct	agt	gtc	aag	atg	ggg	aat	gag	att	gcc	5730
Lys	Thr	Val	Trp	Phe	Val	Pro	Ser	Val	Lys	Met	Gly	Asn	Glu	Ile	Ala	
	1865						1870				1875					
ctt	tgc	cta	caa	cgt	gct	gga	aag	aaa	gta	gtc	caa	ttg	aac	aga	aag	5778
Leu	Cys	Leu	Gln	Arg	Ala	Gly	Lys	Lys	Val	Val	Gln	Leu	Asn	Arg	Lys	
	1880				1885				1890							
tcg	tac	gag	acg	gag	tac	cca	aaa	tgt	aag	aac	gat	gat	tgg	gac	ttt	5826
Ser	Tyr	Glu	Thr	Glu	Tyr	Pro	Lys	Cys	Lys	Asn	Asp	Asp	Trp	Asp	Phe	
	1895			1900				1905							1910	
gtt	atc	aca	aca	gac	ata	tct	gaa	atg	ggg	gct	aac	ttc	aag	gcg	agc	5874
Val	Ile	Thr	Thr	Asp	Ile	Ser	Glu	Met	Gly	Ala	Asn	Phe	Lys	Ala	Ser	
			1915					1920					1925			
agg	gtg	att	gac	agc	cgg	aag	agt	gtg	aaa	cca	acc	atc	ata	aca	gaa	5922
Arg	Val	Ile	Asp	Ser	Arg	Lys	Ser	Val	Lys	Pro	Thr	Ile	Ile	Thr	Glu	
		1930					1935					1940				
gga	gaa	ggg	aga	gtg	atc	ctg	gga	gaa	cca	tct	gca	gtg	aca	gca	gct	5970
Gly	Glu	Gly	Arg	Val	Ile	Leu	Gly	Glu	Pro	Ser	Ala	Val	Thr	Ala	Ala	
	1945					1950					1955					
agt	gcc	gcc	cag	aga	cgt	gga	cgt	atc	ggt	aga	aat	ccg	tcg	caa	gtt	6018
Ser	Ala	Ala	Gln	Arg	Arg	Gly	Arg	Ile	Gly	Arg	Asn	Pro	Ser	Gln	Val	
	1960				1965			1970								
ggt	gat	gag	tac	tgt	tat	ggg	ggg	cac	acg	aat	gaa	gac	gac	tcg	aac	6066
Gly	Asp	Glu	Tyr	Cys	Tyr	Gly	Gly	His	Thr	Asn	Glu	Asp	Asp	Ser	Asn	
	1975			1980				1985							1990	
ttc	gcc	cat	tgg	act	gag	gca	cga	atc	atg	ctg	gac	aac	atc	aac	atg	6114
Phe	Ala	His	Trp	Thr	Glu	Ala	Arg	Ile	Met	Leu	Asp	Asn	Ile	Asn	Met	
			1995					2000					2005			
cca	aac	gga	ctg	atc	gct	caa	ttc	tac	caa	cca	gag	cgt	gag	aag	gta	6162
Pro	Asn	Gly	Leu	Ile	Ala	Gln	Phe	Tyr	Gln	Pro	Glu	Arg	Glu	Lys	Val	

2010	2015	2020	
tat acc atg gat ggg gaa tac cgg ctc aga gga gaa gag aga aaa aac Tyr Thr Met Asp Gly Glu Tyr Arg Leu Arg Gly Glu Glu Arg Lys Asn 2025 2030 2035			6210
ttt ctg gaa ctg ttg agg act gca gat ctg cca gtt tgg ctg gct tac Phe Leu Glu Leu Leu Arg Thr Ala Asp Leu Pro Val Trp Leu Ala Tyr 2040 2045 2050			6258
aag gtt gca gcg gct gga gtg tca tac cac gac cgg agg tgg tgc ttt Lys Val Ala Ala Ala Gly Val Ser Tyr His Asp Arg Arg Trp Cys Phe 2055 2060 2065 2070			6306
gat ggt cct agg aca aac aca att tta gaa gac aac aac gaa gtg gaa Asp Gly Pro Arg Thr Asn Thr Ile Leu Glu Asp Asn Asn Glu Val Glu 2075 2080 2085			6354
gtc atc acg aag ctt ggt gaa agg aag att ctg agg ccg cgc tgg att Val Ile Thr Lys Leu Gly Glu Arg Lys Ile Leu Arg Pro Arg Trp Ile 2090 2095 2100			6402
gac gcc agg gtg tac tcg gat cac cag gca cta aag gcg ttc aag gac Asp Ala Arg Val Tyr Ser Asp His Gln Ala Leu Lys Ala Phe Lys Asp 2105 2110 2115			6450
ttc gcc tcg gga aaa cgt tct cag ata ggg ctc att gag gtt ctg gga Phe Ala Ser Gly Lys Arg Ser Gln Ile Gly Leu Ile Glu Val Leu Gly 2120 2125 2130			6498
aag atg cct gag cac ttc atg ggg aag aca tgg gaa gca ctt gac acc Lys Met Pro Glu His Phe Met Gly Lys Thr Trp Glu Ala Leu Asp Thr 2135 2140 2145 2150			6546
atg tac gtt gtg gcc act gca gag aaa gga gga aga gct cac aga atg Met Tyr Val Val Ala Thr Ala Glu Lys Gly Gly Arg Ala His Arg Met 2155 2160 2165			6594
gcc ctg gag gaa ctg cca gat gct ctt cag aca att gcc ttg att gcc Ala Leu Glu Glu Leu Pro Asp Ala Leu Gln Thr Ile Ala Leu Ile Ala 2170 2175 2180			6642
tta ttg agt gtg atg acc atg gga gta ttc ttc ctc ctc atg cag cgg Leu Leu Ser Val Met Thr Met Gly Val Phe Phe Leu Leu Met Gln Arg 2185 2190 2195			6690
aag ggc att gga aag ata ggt ttg gga ggc gct gtc ttg gga gtc gcg Lys Gly Ile Gly Lys Ile Gly Leu Gly Gly Ala Val Leu Gly Val Ala 2200 2205 2210			6738
acc ttt ttc tgt tgg atg gct gaa gtt cca gga acg aag atc gcc gga Thr Phe Phe Cys Trp Met Ala Glu Val Pro Gly Thr Lys Ile Ala Gly 2215 2220 2225 2230			6786
atg ttg ctg ctc tcc ctt ctc ttg atg att gtg cta att cct gag cca Met Leu Leu Leu Ser Leu Leu Leu Met Ile Val Leu Ile Pro Glu Pro 2235 2240 2245			6834
gag aag caa cgt tcg cag aca gac aac cag cta gcc gtg ttc ctg att Glu Lys Gln Arg Ser Gln Thr Asp Asn Gln Leu Ala Val Phe Leu Ile 2250 2255 2260			6882
tgt gtc atg acc ctt gtg agc gca gtg gca gcc aac gag atg ggt tgg Cys Val Met Thr Leu Val Ser Ala Val Ala Ala Asn Glu Met Gly Trp 2265 2270 2275			6930

cta gat aag acc aag agt gac ata agc agt ttg ttt ggg caa aga att Leu Asp Lys Thr Lys Ser Asp Ile Ser Ser Leu Phe Gly Gln Arg Ile 2280 2285 2290	6978
gag gtc aag gag aat ttc agc atg gga gag ttt ctt ttg gac ttg agg Glu Val Lys Glu Asn Phe Ser Met Gly Glu Phe Leu Leu Asp Leu Arg 2295 2300 2305 2310	7026
ccg gca aca gcc tgg tca ctg tac gct gtg aca aca gcg gtc ctc act Pro Ala Thr Ala Trp Ser Leu Tyr Ala Val Thr Thr Ala Val Leu Thr 2315 2320 2325	7074
cca ctg cta aag cat ttg atc acg tca gat tac atc aac acc tca ttg Pro Leu Leu Lys His Leu Ile Thr Ser Asp Tyr Ile Asn Thr Ser Leu 2330 2335 2340	7122
acc tca ata aac gtt cag gca agt gca cta ttc aca ctc gcg cga ggc Thr Ser Ile Asn Val Gln Ala Ser Ala Leu Phe Thr Leu Ala Arg Gly 2345 2350 2355	7170
ttc ccc ttc gtc gat gtt gga gtg tcg gct ctc ctg cta gca gcc gga Phe Pro Phe Val Asp Val Gly Val Ser Ala Leu Leu Leu Ala Ala Gly 2360 2365 2370	7218
tgc tgg gga caa gtc acc ctc acc gtt acg gta aca gcg gca aca ctc Cys Trp Gly Gln Val Thr Leu Thr Val Thr Val Thr Ala Ala Thr Leu 2375 2380 2385 2390	7266
ctt ttt tgc cac tat gcc tac atg gtt ccc ggt tgg caa gct gag gca Leu Phe Cys His Tyr Ala Tyr Met Val Pro Gly Trp Gln Ala Glu Ala 2395 2400 2405	7314
atg cgc tca gcc cag cgg cgg aca gcg gcc gga atc atg aag aac gct Met Arg Ser Ala Gln Arg Arg Thr Ala Ala Gly Ile Met Lys Asn Ala 2410 2415 2420	7362
gta gtg gat ggc atc gtg gcc acg gac gtc cca gaa tta gag cgc acc Val Val Asp Gly Ile Val Ala Thr Asp Val Pro Glu Leu Glu Arg Thr 2425 2430 2435	7410
aca ccc atc atg cag aag aaa gtt gga cag atc atg ctg atc ttg gtg Thr Pro Ile Met Gln Lys Lys Val Gly Gln Ile Met Leu Ile Leu Val 2440 2445 2450	7458
tct cta gct gca gta gta gtg aac ccg tct gtg aag aca gta cga gaa Ser Leu Ala Ala Val Val Val Asn Pro Ser Val Lys Thr Val Arg Glu 2455 2460 2465 2470	7506
gcc gga att ttg atc acg gcc gca gcg gtg acg ctt tgg gag aat gga Ala Gly Ile Leu Ile Thr Ala Ala Ala Val Thr Leu Trp Glu Asn Gly 2475 2480 2485	7554
gca agc tct gtt tgg aac gca aca act gcc atc gga ctc tgc cac atc Ala Ser Ser Val Trp Asn Ala Thr Thr Ala Ile Gly Leu Cys His Ile 2490 2495 2500	7602
atg cgt ggg ggt tgg ttg tca tgt cta tcc ata aca tgg aca ctc ata Met Arg Gly Gly Trp Leu Ser Cys Leu Ser Ile Thr Trp Thr Leu Ile 2505 2510 2515	7650
aag aac atg gaa aaa cca gga cta aaa aga ggt ggg gca aaa gga cgc Lys Asn Met Glu Lys Pro Gly Leu Lys Arg Gly Gly Ala Lys Gly Arg 2520 2525 2530	7698

acc ttg gga gag gtt tgg aaa gaa aga ctc aac cag atg aca aaa gaa Thr Leu Gly Glu Val Trp Lys Glu Arg Leu Asn Gln Met Thr Lys Glu 2535 2540 2545 2550	7746
gag ttc act agg tac cgc aaa gag gcc atc atc gaa gtc gat cgc tca Glu Phe Thr Arg Tyr Arg Lys Glu Ala Ile Ile Glu Val Asp Arg Ser 2555 2560 2565	7794
gcg gca aaa cac gcc agg aaa gaa ggc aat gtc act gga ggg cat cca Ala Ala Lys His Ala Arg Lys Glu Gly Asn Val Thr Gly Gly His Pro 2570 2575 2580	7842
gtc tct agg ggc aca gca aaa ctg aga tgg ctg gtc gaa cgg agg ttt Val Ser Arg Gly Thr Ala Lys Leu Arg Trp Leu Val Glu Arg Arg Phe 2585 2590 2595	7890
ctc gaa ccg gtc gga aaa gtg att gac ctt gga tgt gga aga ggc ggt Leu Glu Pro Val Gly Lys Val Ile Asp Leu Gly Cys Gly Arg Gly Gly 2600 2605 2610	7938
tgg tgt tac tat atg gca acc caa aaa aga gtc caa gaa gtc aga ggg Trp Cys Tyr Tyr Met Ala Thr Gln Lys Arg Val Gln Glu Val Arg Gly 2615 2620 2625 2630	7986
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aga cct tct gag tgt tgt gac acc ctc ctt tgt gac atc gga gag tcc Arg Pro Ser Glu Cys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser 2665 2670 2675	8130
tcg tca agt gct gag gtt gaa gag cat agg acg att cgg gtc ctt gaa Ser Ser Ser Ala Glu Val Glu Glu His Arg Thr Ile Arg Val Leu Glu 2680 2685 2690	8178
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caa cgc cgg tat ggg ggg gga ctg gtc aga aac cca ctc tca cgg aat Gln Arg Arg Tyr Gly Gly Gly Leu Val Arg Asn Pro Leu Ser Arg Asn 2730 2735 2740	8322
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Gly	Thr	Arg	Ala	Val	Gly	Lys	Pro	Leu	Leu	Asn	Ser	Asp	Thr	Ser	Lys	
				2795					2800					2805		
atc	aag	aac	agg	att	gaa	cga	ctc	agg	cgt	gag	tac	agt	tcg	acg	tgg	8562
Ile	Lys	Asn	Arg	Ile	Glu	Arg	Leu	Arg	Arg	Glu	Tyr	Ser	Ser	Thr	Trp	
			2810					2815					2820			
cac	cac	gat	gag	aac	cac	cca	tat	aga	acc	tgg	aac	tat	cac	ggc	agt	8610
His	His	Asp	Glu	Asn	His	Pro	Tyr	Arg	Thr	Trp	Asn	Tyr	His	Gly	Ser	
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Tyr	Asp	Val	Lys	Pro	Thr	Gly	Ser	Ala	Ser	Ser	Leu	Val	Asn	Gly	Val	
	2840					2845					2850					
gtc	agg	ctc	ctc	tca	aaa	cca	tgg	gac	acc	atc	acg	aat	gtt	acc	acc	8706
Val	Arg	Leu	Leu	Ser	Lys	Pro	Trp	Asp	Thr	Ile	Thr	Asn	Val	Thr	Thr	
2855					2860					2865					2870	
atg	gcc	atg	act	gac	act	act	ccc	ttc	ggg	cag	cag	cga	gtg	ttc	aaa	8754
Met	Ala	Met	Thr	Asp	Thr	Thr	Pro	Phe	Gly	Gln	Gln	Arg	Val	Phe	Lys	
				2875					2880					2885		
gag	aag	gtg	gac	acg	aaa	gct	cct	gaa	ccg	cca	gaa	gga	gtg	aag	tac	8802
Glu	Lys	Val	Asp	Thr	Lys	Ala	Pro	Glu	Pro	Pro	Glu	Gly	Val	Lys	Tyr	
			2890					2895					2900			
gtg	ctc	aat	gag	acc	acc	aac	tgg	ttg	tgg	gcg	ttt	ttg	gcc	aga	gaa	8850
Val	Leu	Asn	Glu	Thr	Thr	Asn	Trp	Leu	Trp	Ala	Phe	Leu	Ala	Arg	Glu	
		2905					2910					2915				
aaa	cgt	ccc	aga	atg	tgc	tct	cga	gag	gaa	ttc	ata	aga	aag	gtc	aac	8898
Lys	Arg	Pro	Arg	Met	Cys	Ser	Arg	Glu	Glu	Phe	Ile	Arg	Lys	Val	Asn	
	2920					2925					2930					
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Ser	Asn	Ala	Ala	Leu	Gly	Ala	Met	Phe	Glu	Glu	Gln	Asn	Gln	Trp	Arg	
2935					2940				2945						2950	
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Ser	Ala	Arg	Glu	Ala	Val	Glu	Asp	Pro	Lys	Phe	Trp	Glu	Met	Val	Asp	
			2955					2960					2965			
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Glu	Glu	Arg	Glu	Ala	His	Leu	Arg	Gly	Glu	Cys	His	Thr	Cys	Ile	Tyr	
			2970					2975					2980			
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Asn	Met	Met	Gly	Lys	Arg	Glu	Lys	Lys	Pro	Gly	Glu	Phe	Gly	Lys	Ala	
		2985					2990					2995				
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Lys	Gly	Ser	Arg	Ala	Ile	Trp	Phe	Met	Trp	Leu	Gly	Ala	Arg	Phe	Leu	
	3000					3005					3010					
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Glu	Phe	Glu	Ala	Leu	Gly	Phe	Leu	Asn	Glu	Asp	His	Trp	Leu	Gly	Arg	
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Lys	Asn	Ser	Gly	Gly	Gly	Val	Glu	Gly	Leu	Gly	Leu	Gln	Lys	Leu	Gly	
			3035					3040					3045			
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Tyr	Ile	Leu	Arg	Glu	Val	Gly	Thr	Arg	Pro	Gly	Gly	Lys	Ile	Tyr	Ala	

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aat gaa gct aag gtg ctt gag ctg ctt gat ggg gaa cat cgg cgt ctt Asn Glu Ala Lys Val Leu Glu Leu Leu Asp Gly Glu His Arg Arg Leu 3080 3085 3090			9378
gcc agg gcc atc att gag ctg acc tat cgt cac aaa gtt gtg aaa gtg Ala Arg Ala Ile Ile Glu Leu Thr Tyr Arg His Lys Val Val Lys Val 3095 3100 3105 3110			9426
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3335 3340 3345 3350

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Ile Glu Glu Asn Glu Trp Met Glu Asp Lys Thr Pro Val Glu Lys Trp
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Ser Asp Val Pro Tyr Ser Gly Lys Arg Glu Asp Ile Trp Cys Gly Ser
3370 3375 3380

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Thr Val Leu

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Leu Lys Arg Gly Met Pro Arg Val Leu Ser Leu Ile Gly Leu Lys Arg
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Ala Leu₅₀ Leu Ala Phe Phe Arg₅₅ Phe Thr Ala Ile Ala₆₀ Pro Thr Arg Ala
Val₆₅ Leu Asp Arg Trp Arg₇₀ Gly Val Asn Lys Gln₇₅ Thr Ala Met Lys His₈₀
Leu Leu Ser Phe Lys₈₅ Lys Glu Leu Gly Thr₉₀ Leu Thr Ser Ala Ile₉₅ Asn
Arg Arg Ser Ser₁₀₀ Lys Gln Lys Lys Arg₁₀₅ Gly Gly Lys Thr Gly₁₁₀ Ile Ala
Val Met Ile₁₁₅ Gly Leu Ile Ala Ser₁₂₀ Val Gly Ala Val Thr₁₂₅ Leu Ser Asn
Phe Gln₁₃₀ Gly Lys Val Met Met₁₃₅ Thr Val Asn Ala Thr₁₄₀ Asp Val Thr Asp
Val₁₄₅ Ile Thr Ile Pro Thr₁₅₀ Ala Ala Gly Lys Asn₁₅₅ Leu Cys Ile Val Arg₁₆₀
Ala Met Asp Val Gly₁₆₅ Tyr Met Cys Asp₁₇₀ Thr Ile Thr Tyr Glu₁₇₅ Cys
Pro Val Leu Ser₁₈₀ Ala Gly Asn Asp₁₈₅ Pro Glu Asp Ile Asp₁₉₀ Cys Trp Cys
Thr Lys Ser₁₉₅ Ala Val Tyr Val Arg₂₀₀ Tyr Gly Arg Cys Thr₂₀₅ Lys Thr Arg
His Ser₂₁₀ Arg Arg Ser Arg Arg₂₁₅ Ser Leu Thr Val Gln₂₂₀ Thr His Gly Glu
Ser₂₂₅ Thr Leu Ala Asn Lys₂₃₀ Lys Gly Ala Trp Met₂₃₅ Asp Ser Thr Lys Ala₂₄₀
Thr Arg Tyr Leu Val₂₄₅ Lys Thr Glu Ser Trp₂₅₀ Ile Leu Arg Asn Pro₂₅₅ Gly
Tyr Ala Leu Val₂₆₀ Ala Ala Val Ile Gly₂₆₅ Trp Met Leu Gly Ser₂₇₀ Asn Thr
Met Gln Arg₂₇₅ Val Val Phe Val Val₂₈₀ Leu Leu Leu Leu Val₂₈₅ Ala Pro Ala
Tyr Ser₂₉₀ Phe Asn Cys Leu Gly₂₉₅ Met Ser Asn Arg Asp₃₀₀ Phe Leu Glu Gly
Val₃₀₅ Ser Gly Ala Thr Trp₃₁₀ Val Asp Leu Val Leu₃₁₅ Glu Gly Asp Ser Cys₃₂₀
Val Thr Ile Met Ser₃₂₅ Lys Asp Lys Pro Thr₃₃₀ Ile Asp Val Lys Met₃₃₅ Met
Asn Met Glu Ala₃₄₀ Ala Asn Leu Ala Glu₃₄₅ Val Arg Ser Tyr Cys₃₅₀ Tyr Leu
Ala Thr Val₃₅₅ Ser Asp Leu Ser Thr₃₆₀ Lys Ala Ala Cys Pro₃₆₅ Thr Met Gly
Glu Ala His Asn Asp Lys Arg Ala Asp Pro Ala Phe Val Cys Arg Gln

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Gly 385	Val	Val	Asp	Arg	Gly 390	Trp	Gly	Asn	Gly	Cys 395	Gly	Leu	Phe	Gly	Lys 400
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Ser 465	Tyr	Thr	Leu	Lys	Leu 470	Gly	Glu	Tyr	Gly	Glu 475	Val	Thr	Val	Asp	Cys 480
Glu	Pro	Arg	Ser	Gly 485	Ile	Asp	Thr	Asn	Ala 490	Tyr	Tyr	Val	Met	Thr 495	Val
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Leu	Pro	Trp 515	Ser	Ser	Ala	Gly	Ser 520	Thr	Val	Trp	Arg	Asn 525	Arg	Glu	Thr
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Pro	Val	Glu	Phe	Ser 565	Ser	Asn	Thr	Val	Lys 570	Leu	Thr	Ser	Gly	His 575	Leu
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Pro 625	Cys	Lys	Val	Pro	Ile 630	Ser	Ser	Val	Ala	Ser 635	Leu	Asn	Asp	Leu	Thr 640
Pro	Val	Gly	Arg	Leu 645	Val	Thr	Val	Asn	Pro 650	Phe	Val	Ser	Val	Ala 655	Thr
Ala	Asn	Ala	Lys 660	Val	Leu	Ile	Glu	Leu 665	Glu	Pro	Pro	Phe	Gly 670	Asp	Ser
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 Gly Leu Leu Gly Ala Leu Leu Leu Trp Met Gly Ile Asn Ala Arg Asp
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 Lys Arg Trp Thr Ala Lys Ile Ser Met Pro Ala Ile Leu Ile Ala Leu
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 1380 1385 1390
 Gly Gly Leu Ala Glu Leu Asp Ile Asp Ser Met Ala Ile Pro Met Thr
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 Ile Ala Gly Leu Met Phe Ala Ala Phe Val Ile Ser Gly Lys Ser Thr

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Ile Leu Pro Ser Val Val Gly Phe Trp Ile Thr Leu Gln Tyr Thr Lys 1490 1495 1500		
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Gly Ser Tyr Gln Ala Gly Ala Gly Val Met Val Glu Gly Val Phe His 1540 1545 1550		
Thr Leu Trp His Thr Thr Lys Gly Ala Ala Leu Met Ser Gly Glu Gly 1555 1560 1565		
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Gly Asp Val Ile Gly Leu Tyr Gly Asn Gly Val Ile Met Pro Asn Gly 1650 1655 1660		
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Pro Ile Arg Tyr Gln Thr Ser Ala Val Pro Arg Glu His Asn Gly Asn 1745 1750 1755 1760		

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 Ile Thr Glu Tyr Thr Gly Lys Thr Val Trp Phe Val Pro Ser Val Lys
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 Val Gln Leu Asn Arg Lys Ser Tyr Glu Thr Glu Tyr Pro Lys Cys Lys
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 1940 1945 1950
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 1955 1960 1965
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 1985 1990 1995 2000
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 Ile Met Leu Ile Leu Val Ser Leu Ala Ala Val Val Val Asn Pro Ser

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Cys Asp Ile Gly Glu Ser Ser Ser Ser Ala Glu Val Glu Glu His Arg		
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<220>

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<220>
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 <223> Description of Artificial Sequence: Synthetic primer

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 <220>
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50	55	60
Ile His Lys Ile Leu Lys Phe Ile Asn Thr His Asn Asn Lys Asn Arg		
65	70	75
Leu Tyr Leu Leu Pro Ser Glu Ile Lys Phe Lys Ile Phe Thr Tyr Leu		
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 <212> DNA
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<220>
 <223> Description of Artificial Sequence: Synthetic primer

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<210> 80
 <211> 36
 <212> DNA
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<220>
 <223> Description of Artificial Sequence: Synthetic primer

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<210> 81
 <211> 36
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 <213> Artificial Sequence

<220>
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 <211> 232
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Cys Ser
caaaggttct tgagggttgt gttaaattga aagcgagaaa taatcataaa ttatttcatt 169
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<212> DNA
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